

ON THE ANATOMY OF *BULIMINUS DJURDJURENSIS*, ANCEY,
FROM THE DJURDJURA MOUNTAINS, KABYLIA.

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THE following description is founded on the investigation of a number of examples, extracted from the shells and preserved in alcohol, which were received from Monsieur C. F. Ancey himself.

EXTERNAL FEATURES.—*Animal* blackish in colour, upper surface with small irregular granulations, on the sides and tail the granules are smaller and less dark; a somewhat larger row surrounding the foot-margin and giving it a slightly tessellated appearance.

Foot rounded in front, gradually narrowing to the tail, the latter pointed and rounded above. Foot-sole whitish in the centre, with a narrow, darker band around the sides. *Mantle* with an even margin, and a small narrow lappet on the right under side.

Tentacles apparently of medium length, black, and very finely granulated. Labial tentacles large, somewhat hatchet-shaped.

Genital pore posterior to, and a little below, the right tentacle.

INTERNAL ANATOMY.—*Jaw* (Fig. I) thin and delicate, with a slight median projection, finely striated, and the lower margin minutely denticulated. When highly magnified the striations appear as somewhat irregular riblets, numerous longitudinal strengthening lines also become visible.

Dentition (Fig. II) has a formula varying from 32 : 1 : 32 to 35 : 1 : 35, in numerous transverse rows. Central tooth smaller than the adjoining laterals, with a single cusp, the cutting-point not quite extending to the basal margin. First eight (in some examples nine) laterals have the apex of the cusp slightly projecting on to the adjoining row of teeth; basal plates somewhat oblique, and produced on the outer sides. The succeeding two or three teeth are transitional, and develop a small ectocone. Marginals with the basal plates much shorter, the cutting-points of the cusp largely developed and slightly variable in outline; the apex in some teeth irregularly rounded, and in others obtusely pointed. Proceeding outwards, the ectocone

develops into an outer cusp, which is sometimes cleft at the apex only, sometimes divided quite to the base, and which thus ultimately gives rise to two, and even three, outer cusps.

Digestive tract (Fig. III).—Buccal mass short and subglobular. Salivary gland (*sl.g.*) small, enveloping the œsophagus, with two salivary ducts emptying into the buccal cavity. Crop (*cr.*) small and well marked, situated immediately posterior to the salivary gland; thence contracted into a smaller tube, with thick walls, that opens into the comparatively large stomach (*st.*), the latter receiving the right and left hepatic ducts (*hp.d.*) as figured. The intestine (*int.*) curves shortly forward, then makes a complete turn to the right, passing across the albumen gland and under the posterior portion of the stomach, again curving forward, passing over the alimentary canal, and terminating in a narrow rectum. The anterior and slightly smaller lobe of the liver partly envelops the stomach and intestine, the posterior end of the stomach being imbedded in the upper lobe.

Genitalia (Fig. IV).—Penis (*p.*) with a long appendix (*app.*), branching from the anterior portion and proceeding back as far as the stomach, the upper part somewhat enlarged and usually having one or two small spiral turns. Posterior to the appendix, it gradually enlarges for a short distance and is then abruptly contracted, proceeding as a more slender organ with the vas-deferens (*v.d.*) inserted a little below the apex. This slender portion is folded across the posterior end of the buccal mass, and has always one, or two, small external papillæ. The interior walls of the penis are minutely granulated: within the appendix is a small double thread-like structure adhering to the walls, contained within the narrow duct and terminating at the lower enlargement. Retractor muscle (*r.m.*) divided anteriorly into two bands, one of which is applied to the stouter portion of the penis and the other to the lower portion of the appendix, the distal end being attached to the floor of the pulmonary chamber. A small muscle also appears to be attached to the vas-deferens. Spermatheca (*spr.*) forming a slender tube enlarged at the apex; from about its middle there branches off a diverticulum, which is slightly enlarged above and closely applied to the oviduct. Albumen gland (*al.g.*) large; hermaphrodite duct (*h.d.*) closely convoluted, the gland (*h.g.*) small and dark in colour, not imbedded in the liver. A minute appendix branches from the hermaphrodite duct close to the junction of the latter with the albumen gland.

Free muscles (Figs. V and VI).—The arrangement of the muscles is very similar to that which obtains in *Helix*. The right and left bands supply the retractors to the foot, head, and tentacles; the right ocular retractor passing through the genital branch. The muscles *r. 1* unite with the head close below the inferior tentacles; the other pair of muscles, *r. 2*, are inserted at the junction of the lower lip and foot. The retractor of the buccal mass branches from the left band posterior to the left pedal muscles, its anterior half dividing into two strands applied to the under side of the buccal mass. In addition to the retractor, the buccal mass has two small anterior muscles (*ant.m.*)

proceeding from the under side and attached to the anterior margin of the foot. The posterior portion of the left band overlies the right, but they are not incorporated with each other until nearing the posterior extremity. The right band is to some extent attached to the wide posterior muscle (*post.m.*) of the foot and tail, the union commencing about midway between the pedal branch and the posterior end.

No pedal gland is present.

Nervous system also appears much to resemble that of *Helix*. A well-marked collar surrounds the œsophagus, salivary ducts, and retractor of the buccal mass; the several ganglia are brownish in colour. The buccal ganglia are situate beneath the œsophagus at its junction with the buccal mass, the right and left buccal nerves running back to the cerebral ganglia.

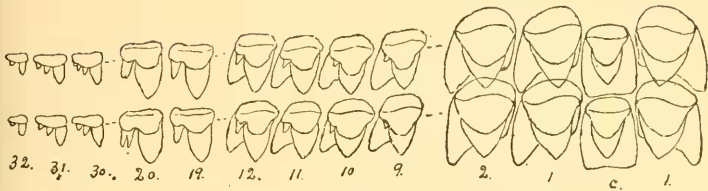
EXPLANATION OF FIGURES ILLUSTRATING THE ANATOMY OF
BULIMINUS DJURDJURENSIS.

- FIG. I. Jaw.
 ,, II. Teeth.
 ,, III. Digestive tract.
 ,, IV. Genitalia.
 ,, V. Free retractor muscles.
 ,, VI. Retractors of the buccal mass, viewed from below.

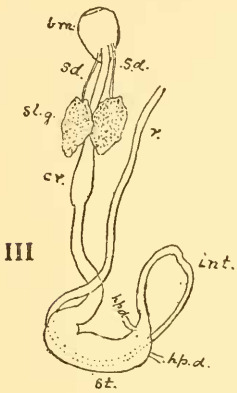
<i>al.g.</i>	albumen gland.	<i>o.t.</i>	ocular tentacles.
<i>ant.m.</i>	anterior buccal muscles.	<i>p.</i>	penis.
<i>app.</i>	appendix.	<i>post.m.</i>	posterior muscle of foot and tail.
<i>b.m.</i>	buccal mass.	<i>r. 1 & 2.</i>	retractor muscles to the head.
<i>b.m.r.</i>	buccal mass retractor.	<i>r.m.</i>	retractor muscle.
<i>col.m.</i>	columellar muscle.	<i>r.p.r.</i>	right pedal retractor.
<i>cr.</i>	crop.	<i>r.t.r.</i>	right tentacle retractor.
<i>div.</i>	diverticulum of spermatheca.	<i>s.d.</i>	salivary ducts.
<i>h.d.</i>	hermaphrodite duct.	<i>sl.g.</i>	salivary gland.
<i>h.g.</i>	hermaphrodite gland.	<i>spr.</i>	spermatheca.
<i>hp.d.</i>	hepatic ducts.	<i>st.</i>	stomach.
<i>int.</i>	intestine.	<i>v.d.</i>	vas-deferens.
<i>l.p.r.</i>	left pedal retractors.		
<i>l.t.r.</i>	left tentacle retractor.		



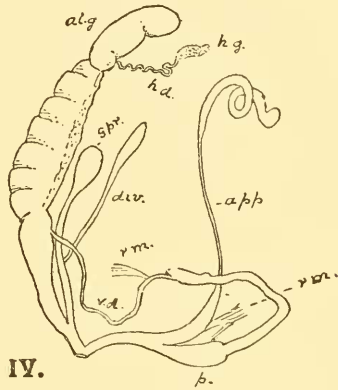
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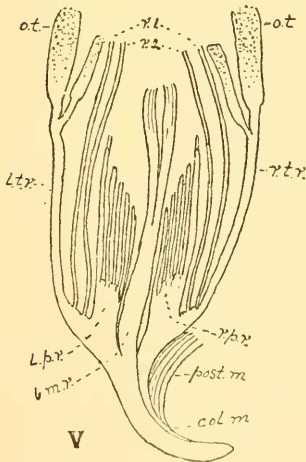
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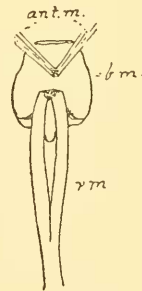
III



IV.



V



VI